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ABSTRACT

This paper examines the establishment and maintenance of a major data processing cooperative in the intermediate districts of the state of Michigan. It traces the development of the computer software system from its early stages as RAMS software to the data base IMS architecture, a level of system software that matches the technological advance of the hardware. (Author/LD)

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A Major Data Processing Co-op: Past Present and Future Where Do We Stand After 10 Years

October 16, 1979

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EA 012 172

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

The title of my presentation suggests that I will discuss a trend line. It also suggests that this trend line will span ten years. My association with trend lines is that we address them for the purpose of looking to the future and this particular trend line projects a rather frightening but exciting future. Very significant improvements have accrued in the last ten years and the rate of improvement appears to be continuing unabated.

I would like to set the stage for this trend line by making several remarks about the contrast in environments; that is how it is today, 1979, compared to how it was in 1969. Today we refer to our operation as a data center, versus what we thought of as a data processing center in 1969. Let me clarify. By dropping the word "processing" it does not mean that we are not processing data, but it does mean "data" and not the "processing" is the focus. We have a responsibility for the storage of the data, the security of the data, the integrity of the data and assuring the users that they will have needed access to the data and concurrently that no unauthorized person or agency will have access to the data.

We think of our vault as a data bank, versus a collection of data files. Not only is the value of the data as stored many times greater, the discipline of its organization is improved significantly. Ten years ago much of the data was not resident at the center but reposed in the various offices of our users.

The 1979 environment can be viewed as an information system, versus a view of a batch operating system in 1969. Elements of both appeared in 1969 and now in 1979 but the shift from batch to information is significant and the shift is continuing.

Today in 1979, we feel we have a true integrated file architecture, versus the 1969 environment in which it was necessary to build cross walks between files to generate needed reports.

Today, it is common to address data elements by name, using the same names when we address the computer as when we address people. However, in 1969, we had to address data elements by geographic file locations when talking to the computer.

Today, our users are sophisticated users, they expect more, demand more and know the questions to ask to get the responses that are required. Naturally this function is relative, some are more sophisticated than others, but the general level continues to improve.

Because the users are more sophisticated, they now tend to have a system view that is district wide, rather than a system view that is narrow in scope. i.e., the business manager recognizes the system must accommodate the needs of all division and departments of the school district.

Response times in 1979 are significantly improved when contrasted with 1969. Our users have become accustomed to one day turnaround for functions that typically required one or two weeks. They have come to expect an hour or less turnaround time for functions that used to require at least a day. In fact, many of our users are truly interacting on a right now basis, inquiring into files and getting almost instantaneous output on a video screen, and then to hard copy immediately if so desired.

These are the physical contrasts that can be drawn. There are other contrasts that the environment produces in how people perceive their responsibilities and how they seek to solve both their short and long range problems.

Having drawn these contrasts with the objective of having you visualize a trend line, we might ask what expectations can we perceive for the future, five or ten years hence.

Although I have set the stage for making a few remarks about the future, I would like to digress and reserve those remarks for the conclusion. At this time, I would like to address the organizational structure within Michigan that made the development of this cooperative possible and to trace some of the significant events of the last decade.

Michigan has 530, K-12 local school districts. These 530 districts lie within 58 intermediate school districts. The intermediate school district in Michigan, on the one hand, performs mandatory functions for the state department of education and, concurrently, is a service agency to the constituent local districts within its boundaries. Data Processing is one of those services that many intermediate districts have elected to provide to their constituency.

As you might suspect the mandatory functions are common to most, if not all, of the 58 intermediates. On the other hand, the permissive functions are extremely varied among the 58 intermediates. Only the larger intermediate districts generally have been able to provide any significant level of data processing service. Of those that provide data processing services, the scope of service available and the delivery techniques vary.

The reason for the variance just mentioned are many. However, the recognition of many benefits that could accrue if two or more intermediates could work together was recognized as early as 1964-65. As a consequence of one or more feasibility studies it became apparent that the needs of the school districts across Michigan were somewhat similar and that many benefits could be derived from working together. This realization led to an application from a planning grant, to develop computer software designed to respond to those needs as defined by school personnel. Shortening the story a little bit, three intermediate districts and the City of Detroit in the metropolitan area, were awarded a project grant over the period of 1967-69, to achieve this purpose. The project was moderately successful. When the money ran out, Oakland Schools, using the output from the project as a beginning, continued the development and installed the early systems. Oakland Schools staff and local district users struggled through the crisis years, when promise and expectation were more imagination than reality. Keeping the faith, we persisted in the belief that the early expectations could eventually be realized.

July 1, 1969, was a turning point, a year of crisis and trauma were immediately behind. Most users, tho bruised by the experience, were determined to stick it out a while longer. September and October were crucial months, the data center must deliver, must show promise, or its future was clouded. Things finally came together, not perfect, but we did have enough success that our credibility began to rebuild; 1969-70 became an excellent year by comparison with the previous year.

You may recall, that this was the year that the major hardware vendor, "unbundled." Prior to this time, computer software may well have been developed as a part of the hardware acquisition process and did not have its own recognized value. This change in the market place prompted Oakland Schools to emulate the private sector and to begin to protect its investment in the software development.

Oakland Schools commenced to copyright, to adopt a distinctive name, to use a trademark and to restrict the use of its software. The pursuit of this strategy has resulted in the formation of a new organization called the RAMS Cooperative. During the years 1969-74, Oakland Schools was the sole owner of the RAMS software. As the sole owner it did, in fact, lease the software to a few agencies, mostly intermediate school districts.

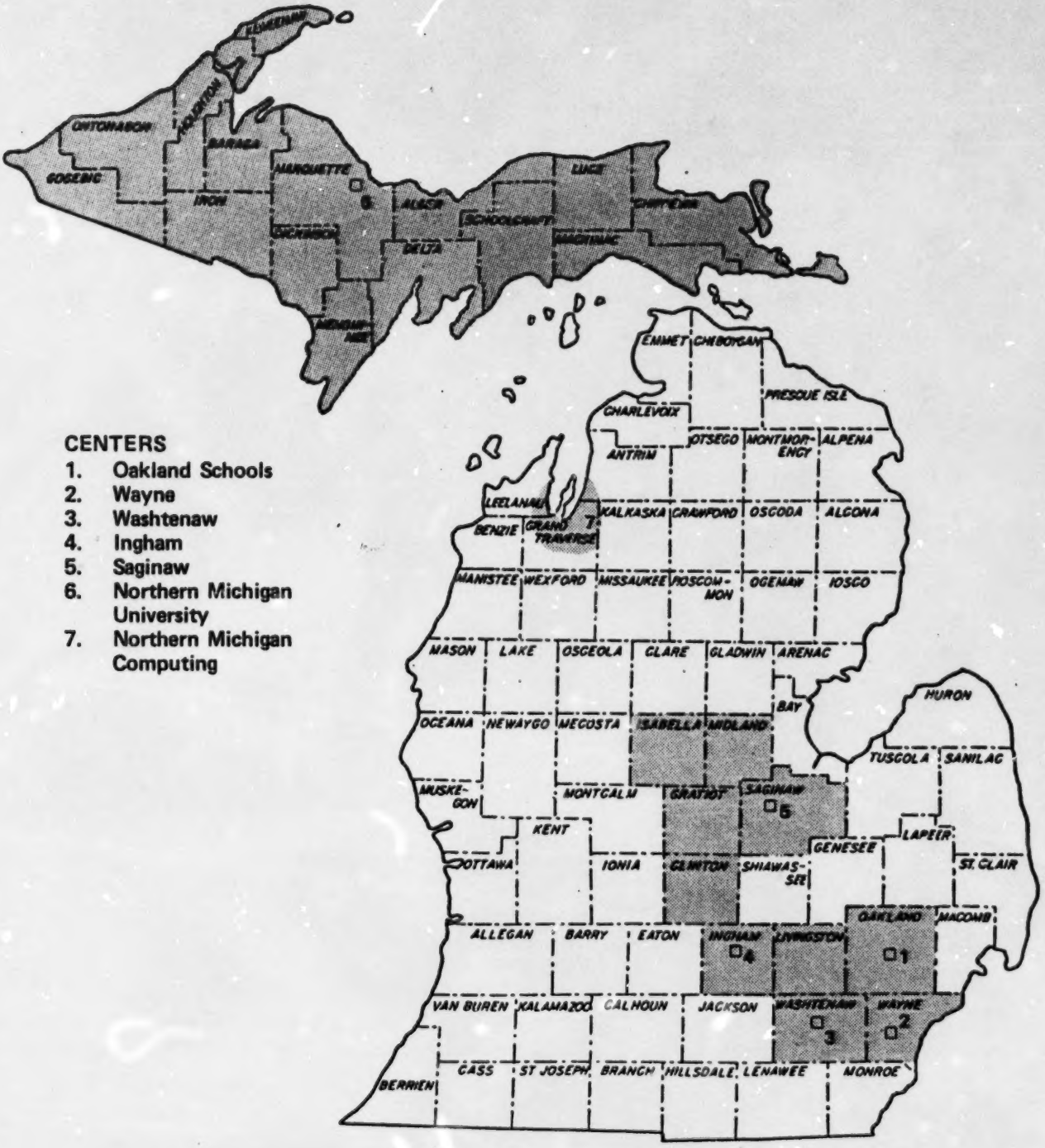
On January 1, 1974, the Wayne Intermediate School District became a co-owner of the RAMS software. Those other agencies that were then using the software, continued as lessees. This arrangement continued through June, 1978, at which time eight other intermediate school districts became co-owners, through an extension of the earlier agreement. The map of Michigan in the handout, indicates the current members and utilization of the software in Michigan.

The RAMS Cooperative operates as a separate entity under a board of control, composed of the Superintendents of the ten intermediate school districts participants. Operating with 12-15 employees, a $350,000 budget, the Cooperative dedicates its resources and energies to the development of advanced software needs of the participants. The needs are determined between many interested groups within each of the intermediate districts. The needs as defined <u>always</u> exceed the resources available. This contention for resources triggers much appropriate debate between and among the directors of the data centers before a recommendation issues from that group to the board of control. The director of the cooperative does receive his list of priorities from the board of control and is expected to deliver products according to that priority list. The priority list is however constantly being challenged, as changing conditions in the environment cause user needs to change from time to time. It requires tenacity on the part of the director and staff to prevent resources from being diverted from long range objectives to short range needs of the users. This situation tends to create

RAMS COOPERATIVE

MEMBERS, CENTERS, SERVICE AREAS

1979-80
SOFTWARE NETWORK



CENTERS

1. Oakland Schools
2. Wayne
3. Washtenaw
4. Ingham
5. Saginaw
6. Northern Michigan University
7. Northern Michigan Computing

of less than optimum performance. The end user has some difficulty in perceiving why it takes so much time to deliver a program or a sub-system. It is difficult, with more than 100 users, for each to realize that their priorities may not be consistant with the priorities of the majority. The priorities of the majority may not even be the determining factor in how priorities are being set. The board of control attempts to be responsive by channeling resources to do the most good for the largest number. The end user is not in a position to assess the most logical sequence for building the over-all system.

Over the last four years the efforts of the Cooperative have been directed to converting the base RAMS software to an IMS architecture. During the first two years the conversion of the student sub-system received priorities. During the last two years, personnel, payroll and finance have received priorities. Priorities during this time have been modified only to accomodate needs imposed by external governmental agencies, i.e., IRS, Social Security, Retirement and Department of Education.

It should be noted at this point that because the software is being used by more than 100 local school districts, changes dictated by an external agency can be accomodated by the RAMS Cooperative on behalf of all users.

About three years ago a staff study within the Michigan Department of Education recommended to the State Board of Education that a broad based task force be formulated to make recommendations to the State Board of Education, concerning how technology should be exploited in Michigan. That task force was appointed and did make its report to the Michigan Department of Education.

Presently the State Board of Education has appointed a second task force, this time to develop the criteria for the establishment of regional computing centers, in as much as the recommendation of the first task force has been that Michigan should exploit technology by creating centers to extend data processing to all children in Michigan. This month of October, there will be seven public

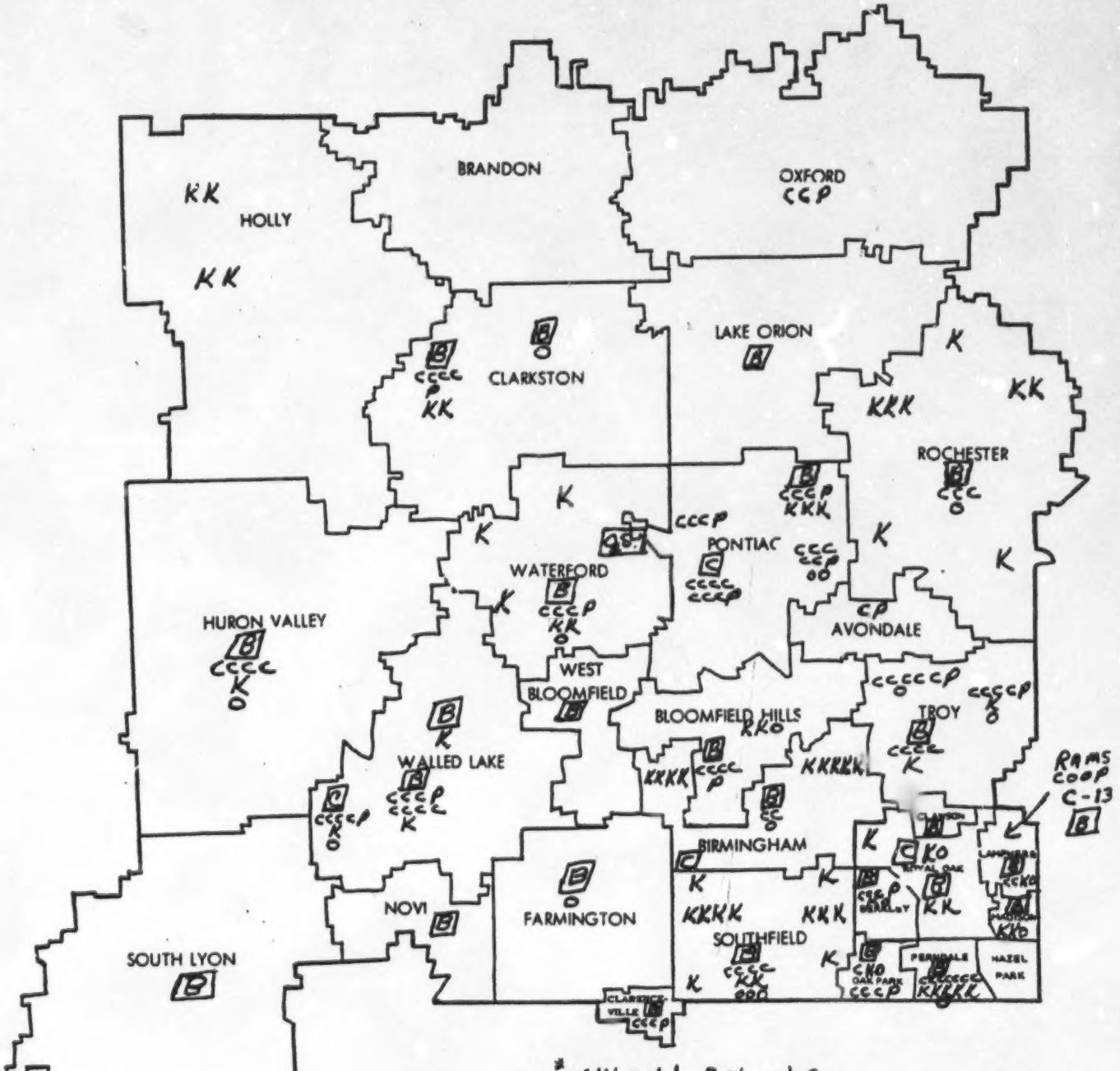
hearings on the proposed criteria. At the conclusion of the hearings the task force will report its findings to the State Board of Education.

Following the establishment of the criteria this same committee will be given a two year period to draw up proposed boundary lines for these service centers. Hearings will be held upon those proposals as well. The deadline for establishing the criteria is December 1979. It therefore follows that the State Board of Education plans to have regional center service areas defined by December, 1981.

For the last few minutes we have been talking about the software house and our relationship with other intermediate districts. I would like now to return to the Oakland Schools operations and discuss briefly our operating environment. I will now draw attention to a second map in the handout to show the 28 local school districts within the Oakland Schools constituency. The computer terminal facilities are noted on that page. The library of computer programs, most of which come under the label of RAMS Computer Program and Products, are resident on the two computers in our data center. Every terminal located on the map is an access point to the computer, the library of programs and the data files via telephone lines. Most batch processing is originated from a batch terminal by sending job control language down the telephone lines to invoke one or more programs from the library of computer programs. Once the batch processing is completed a message is returned to the terminal advising that output is ready to be returned. The terminal operator can opt to take his output at any time. The two computers will be servicing a mix of batch terminals, cathode ray terminals and other keyboard terminals for purposes, ranging from drill and practice to file inquiry, to accounts payable, to grade reporting runs. On a typcial day, there will be from 1000 to 1500 batch type jobs processed through the computer

TELEPROCESSING
NETWORK

OAKLAND SCHOOLS
.28 Local K-12 Districts
.210,000 K-12 Enrollments
.925 Square Miles Area
. Borders City of Detroit on North



*OAKLAND Schools
1- 370-168
1- 370-158

C=Interactive Computer — C - 46
B=Batch Terminal — B
c=Cathode Ray Tube Terminal
k=Keyboard terminal/teletype — K - 11
p=Printer — P - 9
o=Opscan Terminal — O - 4

October 1979

generating from 1 million to 2 million lines of output, all going to remote locations over the telephone wires. Concurrently individual inter-action with the computer will have taken place from over 200 inquiry type terminals.

Twenty six of the twenty eight districts have batch level terminals at the present time. The full resources of the computer facility are available at each of these 26 district offices. A trained operator at a terminal point can invoke any application program from a remote site. This is the equivalent of having their own computer, with additional leverage of having a tested program library validated by years of use and supported by a staff of both discipline (or subject area) specialists and technical specialists, that have worked with the system for a number of years. This introduces the third and most important component of a data center as a service agency. We have discussed software briefly, we have discussed hardware and how the pieces of hardware are linked together. The third and most important component is people. We discussed the RAMS Cooperative and related that from 12-15 people are dedicated through time and energy to advanced program development. They are removed from the day to day concerns of answering telephones, correcting problems encountered by users, or meeting operating deadlines.

At the data center we have two types of user support. One, we will call the discipline specialist, and the other we will call the technical specialist.

The discipline specialist refers to the functionaries in the intermediate school district who are school administrators, directors of subject areas, such as, Science, Math, Social Studies, Directors of Vocational Education, Special Education, Pupil Personnel, etc. These discipline specialists have peer relationships with users at the local district level. They assist their peers in the local school district in becoming aware of how technology can help them, how they can organize at the local level and how they can exploit the

technology in their local school district, provide staff development for those with needs and to assist in trouble shooting when they run into difficulties.

The technical specialist, who reports to the director of data processing, also assists the local school districts in developing procedures to make best use of the data center facility from a technical standpoint. They assist them in developing specifications for equipment needs to carry out their programs, and to inter-face with computer programs to achieve their desired results. The technical specialist also serves as a trouble shooter.

Software, hardware and people are all important, working together they represent the system. No system is perfect. There is a constant change, mistakes are made every day. Mistakes are corrected every day. Logs are created every day. By reading the logs and reacting to what the logs indicate the system continues to improve. Security is a vital concern of the user and of the data center management. Security measures are built into the software and into the physical environment and every breach of security is a signal to review for possible improvement. One measure of security is secrecy. Therefore, I choose not to talk any more about it at this point. You may have questions.

Having discussed the general operating environment as it exists today, I would like now to reflect upon some significant development stages of the past 20 years.

Oakland Schools first provided service to its constituent districts by acting as an inter-face between the local school district and a private service bureau for the function of test scoring and reporting. It soon become apparent that we could not be responsive enough to our constituency with the limited access to technology. Therefore, in September 1962, Oakland Schools installed its first computer to carry out the testing service and reporting function. In the process of making this decision, Oakland Schools determined that it would be necessary to broaden the scope of data processing service to

justify the cost of the operation. In the establishment of data processing services, payroll was an obvious application. The procedures and requirements were well defined. The district administrators were quite receptive, so that the school year 1962-63 marks the launching of the operations that has become the current data center servicing the 28 local school districts as mentioned earlier. A 1964-65 feasibility study prompted the initiation of an effort to create a teleprocessing network and as mentioned earlier, July 1, 1969, was the turning point for it becoming a success.

Significant legislation in 1966 authorized intermediate districts to sell bonds to finance facilities for its operations. Oakland Schools first exercised this authority in 1966 to provide an administration building for its staff offices. In 1969 it used for the first time this authority to bond for the acquisition for a computer. The 1969-70 turnaround year demonstrated that the users would in fact make enough use of the computer facility that hardware capacity would be exceeded. Therefore, Oakland again exercised its authority and purchased its second computer in 1972-73.

The application software continued to improve, the teleprocessing became more reliable. The users continued to grow in sophistication, and again Oakland Schools analyzed the growth pattern and determined that another incremental improvement was necessary. The third computer was financed with a 1976 bond sale and installed in early 1977. The computer that was purchased in 1969 was sold.

The last significant check point in the developmental stage was a decision to convert to a data base architecture, a level of system software that matches the technological advance of the hardware.

I have repeatedly indicated the increased sophistication of our users, this is critical to the exploitation of the system. Nevertheless, we continue to realize that the hardware capabilities and the vendor supplied system software, is potentially well beyond that which we have geared up to exploit.

Earlier in my presentation, I developed the notion of a trend line. Returning to that point, I now wish to project some probabilities for the future. Someone has said, that the only thing that we can be sure of is change. That statement certainly seems to be true for technology. All of us here today are engaged in the field of education in one way or another. No one is more conservative than those who work in the field of education. Yet the change that has taken place in the last ten years, centainly cannot be thought of as being in a conservative mode. If that trend line of the last ten years continues, there will not be just 300 access points to our computers, there will be 3000 access points to several computers. These several computers each inter-connected to all of the others, accomplishing tasks not yet on the drawing board. There will be numerous micro-computers and mini-computers in the network. Today's exciting breakthroughs will be common place, but there will be new potentials to challenge the school administrators and business managers that have accepted the notion that the only sure thing is change.

Thank you very much!